Effect of Postnatal Care-Supportive Education on Knowledge, Willingness and Utilization of Postnatal Care Services among Pregnant Mothers in Rural Areas in Ebonyi State, Nigeria

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Abstracts: Postnatal care is a crucial aspect of maternal and child health, reducing maternal and newborn deaths. However, it is often neglected in the healthcare system. This study aimed to investigate the impact of postnatal care-supportive education on knowledge, willingness, and utilization of PNC services among pregnant mothers in rural areas of Ebonyi State, Nigeria. The research involved six objectives, two hypotheses, and a quasi-experimental design. The study used multistage and simple random techniques to select local government areas and health facilities, while purposive sampling was employed to select 225 pregnant mothers. A pretested questionnaire was used for data collection, with a content validity index of 0.92 and a reliability coefficient of 0.84. Data analysis was conducted using SPSS version 25. The results showed that 94.7% of respondents were Christians, 10.7% attended tertiary institutions, and 16.4% were civil servants. Pre-intervention, pregnant mothers had low knowledge of available PNC services and associated risks, but their knowledge improved significantly post-intervention. Factors such as education, age, and occupation were significantly associated with mothers' knowledge. The study also found low utilization of PNC services at baseline, with only 18.0% using services adequately in previous deliveries and 27.1% not using at all. Mothers demonstrated good willingness to utilize PNC services in subsequent deliveries. The study recommends that skilled healthcare workers provide adequate and well-prepared health education to mothers during antenatal and postnatal clinics to create awareness and make them understand the benefits of PNC services, ultimately improving utilization and reducing maternal and newborn deaths.

Keywords: Postnatal-Care Supportive Education, Knowledge, Utilization, Pregnant

1. INTRODUCTION

Despite series of efforts made by the government nationally and internationally to cut down maternal and infant morbidity and mortality rates, there has been little success as the problems still persist [2]. Such global programmes as the Millennium Development Goals (MDG), which later gave rise to Sustainable Development Goals and recently, world leaders' summit towards attaining zero preventable maternal death by the year 2030, have always been on ground to reduce maternal and infant morbidity and mortality [3]. Stronger efforts and commitments by the government, non-governmental organizations and health professionals are needed to improve health services in all spheres of maternal and child health. More importantly, serious improvement on postnatal care services is needed especially in the rural areas of developing countries of the world where there are fewer viable health facilities and efforts should be made to encourage mothers to utilize such services [4].

Postnatal care services are healthcare services given to mothers and their newborns by skilled health workers throughout the postnatal period while the postnatal period is that period that starts from the moment the baby and placenta are delivered till six (6) weeks postpartum which is equivalent to forty-two (42) days after delivery [5]. These cares include immediate and subsequent monitoring of mothers' and newborns' vital signs (pulse, respiration rates, blood pressure, temperature and heartbeats). Other cares include but are not limited to observations and recording of mothers' blood loss, general condition, hygienic care of the birth canal to prevent infections, maternal nutrition, breastfeeding and immunization of the newborn [6]. When mothers and their newborns fail to receive these services, series of health issues such as prolonged/excessive haemorrhage, intrauterine infections, anaemia, malnutrition and newborn infections including cord infection can arise [7]. Postnatal care is very crucial to the health and survival of mother and her newborn, hence, a "sine qua non" to reduction of maternal and infant morbidities and mortalities. Postnatal care (PNC) services in Nigeria and other developing countries seem to receive less attention than antenatal care and labour services despite the fact that postnatal care is very essential in reducing maternal and infant morbidity and mortality rates [8].

Postnatal care-supportive education in this study involves bringing to the mothers' knowledge all the aspects of postnatal services available for them in health facilities, such as letting them know about the available services, the importance, clinic schedules and where to obtain such services as well as dangers associated with non-utilization. Antenatal and postnatal visits are ideal periods for maternal education concerning postnatal care for mothers and the newborn [9]. Health belief model which is a model of health education/health promotion was used to guide this study. It is therefore viewed that supportive education to mothers during clinic sessions could be of tremendous help to improve their knowledge and perceptions about the services, hence, increase in utilization of the services and decrease in morbidities and mortalities [10].

Maternal and Child Survival Programme (MCSP) (2015) stated "most mothers and their newborn in Africa did not visit health institutions following delivery, hence indicating that postnatal care programmes are among the weakest of all the reproductive and child health programmes". MCSP (2015) went further to state that a care package termed 'best practices of postnatal care services' was recommended by the World Health Organization (WHO) in the year 2013 [11]. Some of the contents of the package were the PNC should commence within 24 hours after delivery regardless of place of delivery, newly delivered mothers and their newborns should be allowed to stay within the facility at least 24 hours following delivery for ease of full clinical examination and that all mothers and their newborns need at least four (4) postnatal checkups within the six weeks of postnatal period to replace the former practice of only one or two visits [12]. Up till now observation has shown that this package has not been implemented by many health facilities especially in the rural areas of Ebonyi State and some HCWs interviewed reported that even when it is prescribed, mothers do not comply with the instructions [13].

It is pertinent to note that globally in 2010, maternal mortality rate (MMR) was 210 per 100,000 live births of which 56% occurred in Sub Saharan Africa (SSA) and MMR in the developing world was found to be fifteen (15) times higher than what it was in developed regions, with Ethiopia staggering at 676 per 100,000 live births [14]. Currently, John-Camillus *et al.,* (2019) recorded MMR of Sub-Saharan Africa as 500 per 100,000 live births which is still unacceptably high not minding national and international efforts to reduce it [15]. For instance, according to Joseph, *et al.,* (2016), Uganda had MMR of 438 per 100,000 live births while Nigeria had 545 per 100,000 live births [16]. According to *Azuh et al.* (2017), in Nigeria for instance, it is difficult to ascertain a specific figure of maternal mortality rate as different researchers obtain different results in different health institutions and zones of the countries with the highest figure being recorded in the North East [17].

In 2018, following a national survey, Ebonyi State of Nigeria had MMR of 512 per 100,000 live births being the last record for the State (News Agency of Nigeria (NAN) 2022) [18]. The neonatal mortality rate was recorded as 34.9 deaths per 1000 live births in 2021 and all these are still on the high side despite the fact that the state embarks on some activities such as emergency transport scheme (ETS) in some LGAs- providing ambulance/tricyclists to help transport mothers and their infants to health facilities when the needs arise [18]. The United States Agency for International Development-Integrated Health Programme (USAID-IHP) in collaboration with Ebonyi State Ministry of Health (MoH) also embarks on training of some members of the National Union of

Road Transport Workers (NURTW) and some volunteer drivers in some selected LGAs to assist mothers to get to health facilities in cases of emergency [19]. Furthermore the state government has been on a gigantic programme of provision of access roads leading to some health facilities. The nurses should as well endeavour to carry out massive campaign to improve mothers' awareness on the importance of PNC services utilization because of its importance in the reduction of maternal and infant morbidities and mortalities [19].

Lack of care during postnatal period is detrimental to the health of mother and child as it may result to death or disabilities of both [20]. The first few hours after delivery are very vulnerable because it is during this time that many mothers and newborns die most, mainly from primary postpartum haemorrhage and maternal exhaustion on the side of the mother and asphyxia neonatorum and hypothermia for the newborn [21]. This is an indication that mother and newborn should be under strict supervision of skilled health care givers during postnatal periods. Furthermore, postnatal period is very special in the life of a woman because during this period, she goes through the physiological process of uterine involution, psychological distress, postpartum blues, process of establishing a successful breastfeeding of the newborn and at the same time plays her other family roles [22]. She therefore needs support, supervision and guidance in matters concerning her health and that of the newborn. Generally mothers are faced with a series of complications during postnatal period both immediate and long-term, including secondary postpartum haemorrhage, puerperal psychosis, pulmonary embolism, puerperal sepsis and baby's septic cord [22]. Adequate and research-oriented postnatal services will go a long way to ameliorate the health problems associated with postnatal period.

Some researchers investigating mothers' knowledge and utilization of postnatal services found varying results. While Sahbanathul (2016) found inadequate knowledge of the mothers regarding personal hygiene and the associated problems during postnatal period, Umar *et al*. (2017) found adequate knowledge which did not correspond with utilization of such services [23]. Sumefun and Ibisomi (2016) reported that the rate of non-utilization of postnatal services was high especially in the rural communities. Generally speaking, poor utilization of PNC services could be attributed to such factors as lack of knowledge of the mothers about the services especially among the rural and hard-to-reach mothers, poor educational background, distance and lack of funds [24]. It is possible that the above factors leading to poor utilization of postnatal services are among the main reasons for persistent high rate of maternal and neonatal morbidity and mortality in developing countries and these are major concerns of healthcare professionals nationally and internationally[24]. It is imperative therefore to carry out studies in relation to knowledge and utilization of maternal healthcare services in different dimensions especially in the area of assessing the effect of postnatal care-supportive education and the result so obtained could serve for documentation and generalization and could be used to guide global best practices of postnatal care to ensure reduction of maternal and newborn morbidities and mortalities locally, nationally and internationally.

The rate of maternal and infant (neonatal) mortality in most of the developing countries of the world is still unacceptably high, and this poses public health concerns worldwide. The postnatal period is a critical phase in the lives of mothers and newborn babies and most maternal and infant deaths occur within the first month after birth [17]. When a baby is delivered, it is mandatory for healthcare workers to commence PNC services within the first 24 hours for both mother and the newborn. However, mothers do not come for these services and this may result to maternal and newborn morbidities and mortalities. MCSP (2015) documented that 2.8 million newborns died in their first month of life in the year 2013 and out of this figure, 1 million died on the first day of life. The rate of maternal and neonatal deaths is higher among women in the rural areas than in their urban counterparts [3]. Furthermore, the burden of maternal postpartum complications especially during the first week following delivery is a concern to health professionals nationally and internationally.

The researcher also observed that in most of the rural health facilities in Ebonyi State, health talks to mothers concerning PNC services and the benefits were often given in a shabby and haphazard nature. This may not be strong enough to equip the clients with the right knowledge needed to encourage them to attend PN clinics for utilization of services and as at when due.

Probably rural women in Ebonyi State do not know the types of postnatal services available for their use, where and when to obtain such services and the dangers a mother could encounter if she fails to receive the services. Again, some barriers such as cost of services, distance from mothers' abodes to health facilities and poor knowledge of maternal health services; could prevent mothers in rural areas in Ebonyi State from accessing PNC services and all these might affect their capabilities to make their own decisions about seeking maternal health care services and other reproductive rights [25]. All these point to the fact that immediate and later postnatal care for mothers and their neonates are very essential to their survival.

For maternal and infant mortality rates to reduce, attention has to be given to postnatal services as much as or even more than other aspects of maternal and child health services. This is because early and later postnatal interventions have the potential to change the maternal and newborn mortality ratio in developing countries of Sub Saharan Africa (SSA) [26]. It has been observed that a good number of mothers in the rural areas receive antenatal care, but only a very few would turn out for postnatal care services [27]. Using the Nigerian demographic and health survey of 2013, Sumefun and Ibisomi (2016) found that 63% of mothers did not receive postnatal care services; in most cases rural women in developing countries are noted for having poor educational background, lack of means of livelihood and problem of distance which usually affect their utilization of maternal health care services [28].

In Nigeria, maternal and neonatal mortality rates still remain high despite the implementation of interventions such as Safe Motherhood Initiatives (SMI), Millennium Development Goals (MDGs) which later gave rise to Sustainable Development Goals (SDGs), Emergency Obstetric Care (EOC), and Mother and Child Care Initiatives (MCCI), [17]. These initiatives have not made remarkable improvements on utilization of postnatal services in most rural areas of Nigeria.

In Ebonyi State, the maternal mortality rate of 512 per 100,000 live births recorded in 2018 (the last national recorded figure) is a course for alarm (NAN, 2022) [2]. In spite of some of the activities going on in Ebonyi State to improve maternal care services (ETS, aids from USAID-IHP and provision of access roads), it seems there is yet no improvement because anecdotal observations by the researcher showed that a good number of mothers in rural areas of Ebonyi State avoid postnatal services for reasons not yet documented. The study concerning knowledge, willingness and utilization of PNC services (using supportive education as an intervention) may have been done but not to the researcher's knowledge. To this effect, it is deemed proper to carry out this study for policy formulation, bridging the gap in dearth of literature and to make improvement where necessary especially as it concerns the rural mothers' knowledge and utilization of PNC services which will eventually help to reduce maternal and infant morbidity and mortality rates. All the above points serve as the impetus to this study.

Operational Definition of Terms

The terms defined operationally include: knowledge of mothers about PNC services available in the facilities where they attend, utilization of PNC services (extent of utilization), and knowledge about risks associated with non-utilization of PNC services, postnatal care-supportive education and effect of supportive education.

Knowledge of pregnant mothers about PNC services available in the health facility: This means mothers being aware of PNC services rendered in the facility, (such as newborn-cord care, infant and maternal immunization, maternal hygiene education and family planning services). For the purpose of this study it means mothers being able to identify available services from among several options. Identifying four (4) options and above, means good knowledge while less than 4 options means poor knowledge. The essence is that some services may be available in the health centre yet the mothers may not know that such services exist there, thus will not go to obtain them. Knowledge is said to precede utilization [29].

Knowledge about risks associated with non-utilization of PNC service: Mothers being aware of some dangers that can occur to their health or the health of the newborn if they fail to use PNC services. In this study, the risks include, excessive bleeding occurring to mother after delivery, neglect of adequate maternal hygiene, genital infection, early pregnancy after each delivery (lack of family planning knowledge), low level of blood (anaemia) on the side of the mother; neglect of infant immunizations, (which could eventually lead to serious infant diseases such

as poliomyelitis), infection of baby's cord and poor nutrition. A mother being able to identify six (6) and above out of the twelve (12) risk factors is said to have good knowledge while less than 6 is regarded as poor knowledge of the risk factors [30].

Extent of utilization of PNC services: This means the degree to which mothers utilized the available postnatal care services in their health facilities during previous deliveries. For the purpose of this study, it is graded as either, non-utilization, poor utilization, moderate utilization and adequate utilization. Non utilization means that mother has not attended postnatal clinic before or did not attend in her last delivery. Poor utilization= mother attended only once after delivery and received some services, for example, at six weeks postpartum. Moderate utilization= mother attended two times and received some services. Adequate utilization= mother attended postnatal clinic up to 3 times in the previous delivery; attended within the first 24/48hours, two weeks and 6 weeks after delivery which is the correct schedule, (WHO recommendation) [31].

Willingness to utilize PNC services: During the post intervention assessment, postnatal care utilization was assessed by the participant's willingness to attend and access the stated postnatal care services in their subsequent deliveries (since this study is a cross-sectional and a student's work). Willingness to utilize PNC services simply put, means mothers being ready and willing to utilize PNC services during subsequent postnatal period. For the purpose of this study, it was measured with nine (9) question items of 3-point modified Likert's scale type- (using Yes, Not sure, and No) with decision rule of 2.0 and above denoting acceptance while less than 2.0 means 'rejection'[32].

Postnatal care-supportive education: In this study it means a well-organized postnatal care health education package delivered in a more formal way (than a health talk) using instructional materials (posters), which involves teaching/demonstrating to mothers about salient issues concerning PNC services including:

-What is meant by postnatal care services?

-Types of services/benefits

-Where to obtain such services

-Time factor for each service (the appropriate time to get the service following a delivery)/ appointment schedules.

-Risks associated with non-utilization of PNC services.

Effect of postnatal care-supportive education: This was ascertained by mothers being able to answer questions correctly on PNC services and risks associated with non-utilization which they were not able to answer before the supportive education intervention. The effect was also assessed by ascertaining the mothers' willingness to attend postnatal clinics and utilize the services in their subsequent deliveries using a 3-pot modified Likert's scale type of questions as stated above.

In this study, the effects of postnatal care-supportive education on the respondents were assessed about 3 months after the intervention (after the respondents have delivered of their newborns).

Conceptual Framework

Several theories could be used to support and guide this study. Prominent among them is the Health Belief Model.

Health belief model (HBM)

Health Belief Model is a health education and health promotion model which can be used to ascertain why some people can accept a behavioural change towards disease prevention or treatment acceptance while others cannot. This was formulated by Beckar in 1984 but before then it has been used in another dimension by early social psychologist Hoch Baum, Rosen Stock and Kegels in the 1950s to ascertain the role of certain beliefs and common sense which predict some actions. HBM has been subjected to series of revisions and can be used to study the problems of non-compliance to medical treatments [33].

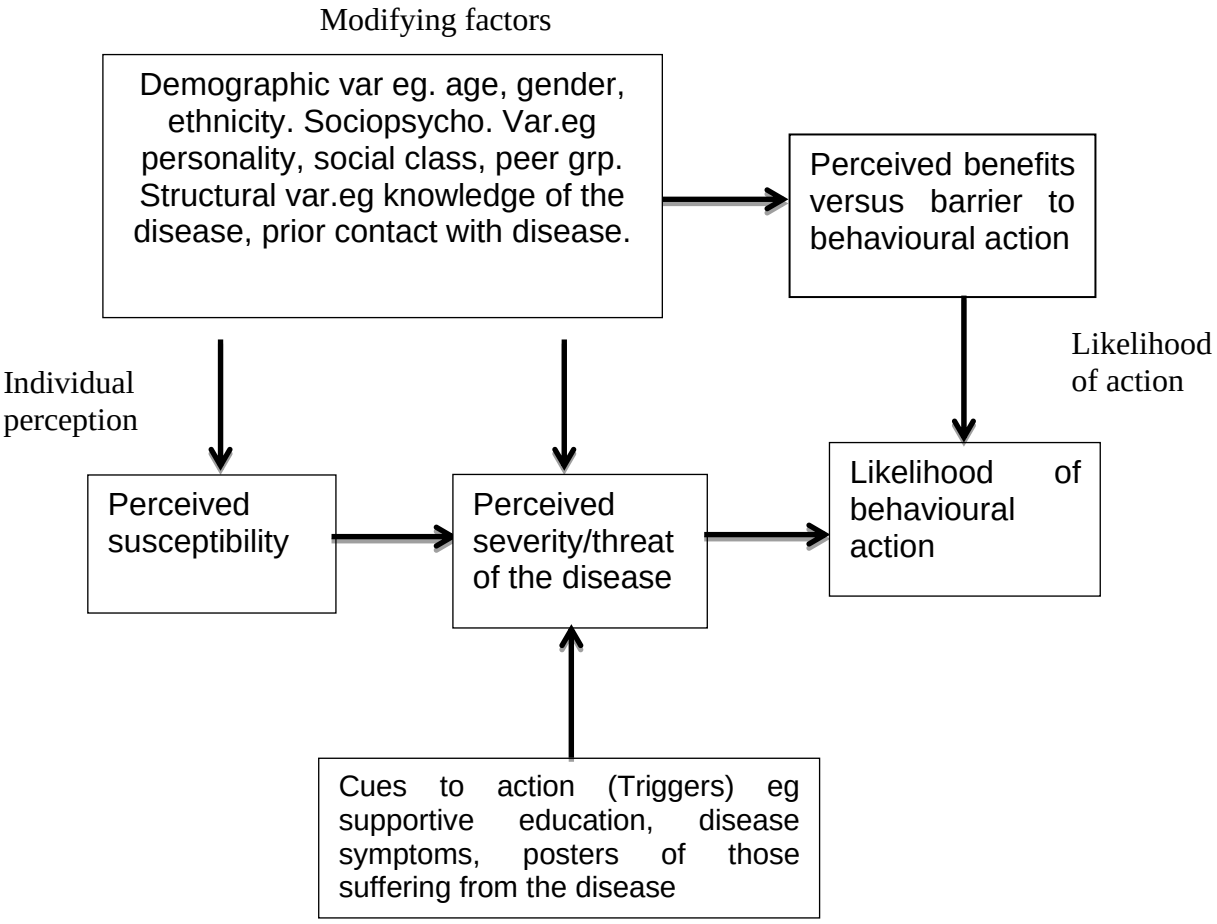

Fig. 1: Health Belief Model (Source: [1])

HBM is based on the fact that for a behaviour change to occur/succeed, the individual concerned must have the interest and reason to change, must feel threatened to the negative behaviour in question and feel that a change will be beneficial and at an affordable cost.

It helps to gather information about people's views of their state of health and what factors can influence them to change. HBM deals with certain perceptions (the constructs) which act as determinants of health behaviours including perceived susceptibility, perceived severity, and perceived benefits versus barriers, health motivations and cues to action.

MATERIAL AND METHODS

Research Design

The design for this study was a quasi-experimental as it gave room for assessing the knowledge and extent of utilization of postnatal care services before and after supportive education intervention in a community-based cross-sectional study. The type of quasi-experimental design used was one group before and after design which usually helps to establish cause and effects relationship without randomization. This type of design was successfully used in a similar study in Sokoto State, Nigeria by Ango *et al.* (2018), though the authors in the previous study used two groups including intervention and control [34].

Setting

The research was conducted in six randomly selected rural health facilities in Ebonyi State, Nigeria. The state is located in the southeastern part of the country and has three senatorial zones and thirteen local government areas (LGAs). Ebonyi State is known for its quality rice and yam production and is considered one of the less privileged and less developed states in Nigeria.
The study involved six health facilities: Ngbo Health Centre Okposhi Ngbo, St Vincent Hospital Ndubia Izzi, Rural Improvement Mission (RIM) Hospital Ikwo and Umuezeokoha PHC Ezza North, Ukpa PHC Afikpo, and Okaria PHC Onicha. The Ngbo Health Centre is a government-owned facility with six beds and records about 70 maternity cases monthly. The St. Vincent Hospital Ndubia is a faith-based facility owned by the Catholic Diocese of Abakaliki and records about 100 maternity cases monthly.

The Umuezeokoha health facility, a government-owned facility, records about 60 maternity cases per month. The Ukpa Health Centre records about 50 maternity cases per month and has four skilled health care workers. The Okaria Health Centre, a government-owned primary health care center, treats mainly maternity cases and records about 60 cases within a month.
The choice of rural areas for this study was informed by the high maternal and child morbidity and mortality rates in rural areas. Research on MCH issues in rural areas of Ebonyi State is limited, and more research is needed to better understand the situation.

Population of Study

The target population of this study included all the pregnant mothers receiving antenatal care at the six selected health facilities in the three senatorial zones during the study period. A total of 450 pregnant mothers were estimated based on the average monthly records of antenatal cases at the selected health facilities. The population was as follows:

Table 1. Population of the study

Health facility	Population
Ngbo Health Centre (HC)	70
St Vincent Hosp. Ndubia	110
RIM, Ikwo	100
Umuezeok-oha HC	60
Ukpa PHC	50
Okaria PHC	60
Total	**450**

Source: Record units/ registers of the health facilities involved.

Sample Size

Sample size determination using power analysis

Formula:

$$PA = \frac{\frac{Z^2 \times P(1-P)}{e^2}}{\frac{1 + Z^2 \times P(1-P)}{e^2 N}}$$

Where:

N = Population = 450

e = error margin= 0.05

P = Standard deviation = 0.5

Z = E. Score = 1.96 (Constant) See appendix K.

The sample size was calculated using power analysis formula which gave a total score of 207 but based on the decision of the researcher, a sample size of 225 (which was the sample on ground during the study period) was used for this study and this corresponded with 50% of each facility monthly turn-out. The sample was made up of the pregnant mothers who met the inclusion criteria.

Inclusion Criteria

Those included in this study were:

-Pregnant mothers at their 3rd trimester

-Those that have had previous childbirth at least one child before the present pregnancy.

Sampling Technique

Multistage sampling technique was used in two stages including simple random sampling to select the six (6) LGAs out of thirteen (two LGAs from each of the three senatorial zones of Ebonyi State). This was followed by another simple random sampling to select six (6) health facilities, one (1) from each of the 6 LGAs.

Finally, purposive sampling technique was employed to select the participants that met the inclusion criteria for the study. Control of the confounding variables was achieved by restriction method. This was the method used by the researcher to ensure that only those with the characteristics of interest were recruited. That notwithstanding, control of contamination was not completely easy hence, this formed one of the limitations encountered by the researcher during the course of this study.

Instrument for Data Collection

This study used a researcher-developed, structured, and pretested questionnaire to assess the willingness of respondents to utilize postnatal care services in their subsequent deliveries. The questionnaire was divided into two sections, A and B, representing demographic variables and the main section (B) addressing research objectives. The instrument was designed based on literature reviewed, including Umar et al.'s study on knowledge and utilization of PNC services among women in Nigeria, Neeta et al.'s assessment of maternal health care services in

rural areas, and Lwelamiri et al.'s study on maternal postnatal care services in selected villages in Tanzania. The questionnaire items were close-ended, allowing participants to select options that best described their disposition about the issue being assessed.

Procedure for Data Collection

Initial data collection (Baseline): The researcher showed the copies of ethical clearance certificates to the management of each of the health facilities involved in the study.

In each of the facilities, the nurse in charge introduced the researcher to the participants. The researcher and her assistants established rapport with the respondents and explained the procedure and guided them during the process of completing the questionnaire. Pre-intervention data were collected during the respondents' pregnancy period and records were kept properly. Two hundred and twenty-five (225) copies of questionnaire were administered to the participants using face to face method of data collection and all were properly completed and collected afterwards with a return rate of 100%.

Post-intervention data collection: This was done during the postnatal periods of the participants. Some were met at the lying-in rooms, congratulated for safe delivery and allowed to have enough rest after which they were encouraged to complete the post-intervention form (under the guidance of the research assistants). Others completed the questionnaire during immunization clinics as appointed after delivery. In some of the health facilities immunization clinic runs twice a week while in others, it holds once. Most of the participants complied with their immunization appointments during which time they were guided to complete the second phase of the questionnaire. Some were met during early postnatal clinic as instructed during the teaching. A few patients were followed up to their homes to collect the data. With the help of the research assistants, the procedure went on concurrently in the various health facilities involved in this study. At the end, 216 (96%) participants completed the questionnaire which were arranged according to the various health facilities and sent for analysis.

Method of Data Analysis

The study analyzed data from pre and post intervention exercises using descriptive and inferential statistics. Demographic data was presented on frequency distribution tables, and relationships between demographic data and respondents' knowledge were assessed using binary logistic regression statistics. Descriptive statistics were used to analyze the extent of utilization of PNC services and willingness to utilize them in subsequent childbirths. Inferential statistics were used to test null hypotheses, and Chi square (X2) was used to compare differences between variables. The two null hypotheses (Knowledge about PNC services pre and post intervention and Knowledge of risks associated with non-utilization of PNC services pre and post intervention) were rejected due to statistical differences observed.

RESULTS

The results obtained from data analysis with their interpretations were presented in here. Out of the two hundred and twenty-five (225) copies of questionnaire administered, all of them (100%) were properly completed, returned and fitted for analysis at pre-intervention, while only two hundred and sixteen (216) (96%) were available at post intervention.

Table 2. Demographic data of the respondents on the effect of supportive education on knowledge, willingness and utilization of PNC services among pregnant mothers in rural Ebonyi State

Demographic Data	No of Respondents (N=225)	Percentage
Age (years)		
≤20	26	11.6
21-25	102	45.3
26-30	49	21.8

Demographic Data	No of Respondents (N=225)	Percentage
31-35	21	9.3
36-40	20	8.9
>40	7	3.1
Highest level of education		
No school attended	34	15.1
Primary education only	78	34.7
Secondary education	89	39.6
Tertiary education	24	10.7
Occupation		
Civil servant	37	16.4
Trading	78	34.7
Farming	90	40.0
Not engaged in any work	20	8.9
Religion		
Christianity	213	94.7
Islam	5	2.2
Traditional	4	1.8
Others	3	1.3
Tribe		
Igbo	197	87.6
Yoruba	10	4.4
Hausa	6	2.7
Others	12	5.3
Number of children		
1-2	99	44.0
3-4	83	36.9
5 and above	43	19.1
Gestational age of current pregnancy (weeks)		
28-31	40	17.8
32-35	67	29.8
>35	118	52.4

Table 3A. Objective 1- Knowledge about available postnatal services among pregnant mothers in rural Ebonyi State before and after intervention

Available Postnatal Services	Pre-intervention (N=225)	Post-intervention (N=216)	χ^2	P-value
Checking of vital signs (blood pressure, pulse, temperature, and respiration)				
Yes	135(60.0%)	166(76.9%)	14.444	<0.001
No	90 (40.0%)	50 (23.1%)		
Examination of birth canal				
Yes	125(55.6%)	193(89.4%)	62.587	<0.001
No	100(44.4%)	23 (10.6%)		
Checking blood level to rule out anaemia				
Yes	68 (30.2%)	167(77.3%)	98.185	<0.001
No	157(69.8%)	49 (22.7%)		
Giving tetanus toxoid to mothers				
Yes	58 (25.8%)	153(70.8%)	89.652	<0.001
No	167(74.2%)	63 (29.2%)		

Available Postnatal Services	Pre-intervention (N=225)	Post-intervention (N=216)	χ2	P-value
Immunization of babies				
Yes	209(92.9%)	198(91.7%)	0.231	0.631
No	16 (7.1%)	18 (8.3%)		
Family planning				
Yes	43 (19.1%)	164(75.9%)	142.828	<0.001
No	182(80.9%)	52 (24.1%)		
Health talk on breastfeeding, perineal care				
Yes	80 (35.6%)	125(57.9%)	22.059	<0.001
No	145(64.4%)	91 (42.1%)		

Table 3B. Level of knowledge about available postnatal services before and after intervention (summary)

Level of Knowledge about Available Postnatal Services	Pre-intervention (N=225)	Post-intervention (N=216)	χ2	P-value
Poor knowledge	143(63.6%)	89 (41.2%)	22.081	<0.001
Good knowledge	82 (36.4%)	127(58.9%)		
Mean knowledge	**3.19±1.93**	**5.40±1.33**	**13.941***	**<0.001**

*t-test used

Table 3C. Relationship between demographic data of the respondents and their knowledge about available postnatal services (pre-intervention)

Demographic Data	Knowledge about Available Postnatal Services		χ2	P-value
	Poor Knowledge (n=143)	Good Knowledge (n=82)		
Age (years)				
≤30	120(67.8%)	57(32.2%)	6.443	0.011
>30	23 (47.9%)	25(52.1%)		
Highest level of education				
Below Secondary	93(83.0%)	19(17.0%)	36.536	<0.001
Secondary & above	50(44.2%)	63(55.8%)		
Occupation				
Not employed	18 (90.0%)	2 (10.0%)	19.643	<0.001
Government employed	13 (35.1%)	24(64.9%)		
Self employed	112(66.7%)	56(33.3%)		
Religion				
Others	9 (75.0%)	3 (25.0%)	0.171	0.397
Christianity	134(62.9%)	79(37.1%)		
Tribe				
Others	22 (78.6%)	6 (21.4%)	3.113	0.078
Igbo	121(61.4%)	76(38.6%)		
Number of children				
1-2	72(72.7%)	27(27.3%)	6.511	0.039
3-4	46(55.4%)	37(44.6%)		
5 and above	25(58.1%)	18(41.9%)		
Gestational age of current pregnancy (weeks)				
≤35	15 (37.5%)	25(62.5%)	14.259	<0.001
>35	128(69.2%)	57(30.8%)		

Table 3D. Binary logistic regression of the relationship between demographic data of the respondents and their knowledge about available postnatal care services

Demographic Data	Coefficient	S.E. of Coefficient	P-value	Odd Ratio	95% C.I. for Odd Ratio
Age (years)					
≤30 (*ref*.)					
>30	1.549	0.528	0.003	4.707	1.672-13.248
Highest level of education					
Below Secondary (*ref*.)					
Secondary & above	2.703	0.478	<0.001	14.972	5.851-38.081
Occupation					
Not employed (*ref*.)					
Government employed	3.508	1.070	0.001	33.379	4.101-271.68
Self employed	1.412	0.916	0.123	4.105	0.681-24.725
Tribe					
Others (*ref*.)					
Igbo	0.463	0.705	0.511	1.589	0.399-6.329
Number of children					
1-2 (*ref*.)					
3-4	-1.147	0.488	0.019	0.318	0.122-0.826
5 and above	0.782	0.577	0.175	2.186	0.705-6.776
Gestational age of current pregnancy (weeks)					
≤35 (*ref*.)					
>35	-2.231	0.469	<0.001	0.107	0.043-0.270

DISCUSSION

The results in table 2 showed the responses on the demographic data of the respondents. Responses on the age of the respondents showed that out of the 225 respondents for the study at pre-intervention, 45.3% of them were in age range 21-25, 21.8% of them were in age range 26-30 and only 3.1% of them were in age range 40 and above. Responses on the highest educational level of the respondents showed that 15.1% of them had no formal education, 34.7% of them had primary education, while 39.6% of them had secondary education, and 10.7% of them had tertiary education. More so, responses on the occupation of the respondents showed that 16.4% of them were Civil servants, 34.7% of them were traders, while 40.0% of them were of farmers. Responses on the religion of the respondents showed that majority (94.7%) of them were Christians. Furthermore, responses on the tribe of the respondents showed that 87.6% of them were Igbos. Furthermore, responses on the number of children had by the respondents showed that 44.0% of them had 1-2 children. The gestational age of current pregnancy of the respondents showed that 52.4% of them were more than 35weeks.

Responses from Table 3(a) showed the percentage responses on respondents' knowledge about available postnatal services before and after intervention. Out of the 225 respondents in the pre-intervention and 216 respondents in the post intervention for this study, 60.0% of them knew that checking vital signs takes place in their health facilities, which was significantly increased to 76.9% post intervention ($P<0.05$). Also, 55.6% of the respondents knew about examination of birth canal, which was significantly increased to 89.4% post intervention. More so, 30.2% of them knew about checking blood level to rule out anaemia, which was significantly increased to 77.3% post intervention. In addition, 25.8% of them knew about giving tetanus toxoid to mothers, which was significantly increased to 70.8% post intervention. However, 92.9% of them knew about immunization of babies but this finding was not significant at post intervention. Their knowledge on family planning increased from 19.1% to 75.9% post intervention ($P<0.05$), while their knowledge on health talk on breastfeeding, perineal care increased from 35.6% to 57.9% post intervention ($P<0.05$).

Responses from Table 3(b) above showed the percentage responses on the level of knowledge about available postnatal services before and after intervention. Out of the 225 respondents in the pre-intervention and 216 respondents in the post intervention for this study, 36.4% of them had good knowledge, which was significantly increased to 58.9% post intervention ($P<0.05$).

Responses from Table 3(c) showed the relationship between demographic data of the respondents and their knowledge about available postnatal services. Age, highest level of education, occupation, number of children, and gestation age of current pregnancy of the respondents were significantly related to their knowledge about available postnatal services ($P < 0.05$). This implies that those that were above 30years had better knowledge of available postnatal services than those in age 30years and below. Also, those that had secondary education and above had better knowledge of available postnatal services than those that had below secondary education. More so, those that were government employed had better knowledge of available postnatal services than those that were self-employed and those that were not employed at all. In the same vein, those that had 3-4 children and 5 & above children had high knowledge of available postnatal services than those that had 1-2 children. Lastly, those that were in less or 35 weeks gestational age of current pregnancy had higher knowledge of available postnatal services than those above 35 weeks. However, religion and tribe had no significant relationship to their level of knowledge about available postnatal services ($P > 0.05$).

The demographic variables that were significantly related to their knowledge about available postnatal services above were subjected to binary logistic regression to ascertain the magnitude of relationship using the first option as the reference value. Age, highest level of education, occupation, number of children, and gestational age of current pregnancy of the respondents were still significantly related to their level of knowledge about available postnatal services ($P<0.05$). This implies that the respondents that were more than 30years of age were 4.7 times more likely to have better knowledge about available postnatal services than those in age 30 years and below (AOR=4.7, 95% C.I. for AOR=1.672-13.248). Furthermore, the respondents that had secondary education and above were 15 times more likely to have better knowledge about available postnatal services than those that had below secondary education (AOR=15.0, 95% C.I. for OR=5.851-38.081). More so, the respondents that were government employed were 33 times more likely to have better knowledge about available postnatal services than those not employed (AOR=33.4, 95% C.I. for AOR=4.101-271.68), however, those that were self-employed were 4 times more likely to have good knowledge about available postnatal services than those not employed but not significant (AOR=4.1, 95% C.I. for OR=0.681-24.725). Furthermore, the respondents that had 3-4 children were 3 times less likely to have good knowledge about available postnatal services than those that had 1-2 children (AOR=0.32, 95% C.I=0.122-0.826), however, those that 5 or more children were 2 times more likely to have better knowledge about available postnatal services than those that had 1-2 children but not significant (AOR=2.19, 95% C.I=0.705-6.776). Lastly, the respondents in more than 35 weeks gestational age of current pregnancy were 9 times less likely to have better knowledge about available postnatal services than those in 35 weeks or less (AOR=0.11, 95% C.I=0.043-0.270).

CONCLUSION

Based on the major findings made in this study the following conclusions were drawn:

The knowledge of postnatal care services among pregnant mothers attending rural health facilities in Ebonyi State of Nigeria was very poor, so also their knowledge about dangers associated with non-utilization of PNC services.

Mothers at gestational age of 35weeks or below demonstrated better knowledge of risks associated with non-utilization of PNC services than those with higher gestational age.

Only a very few mothers utilized PNC services adequately; while a good number of them did not attend PN clinic at all; those who attended came only once which does not imply utilization.

Postnatal care-supportive education was very effective in improving pregnant mothers' knowledge about PNC services and health risks associated with non-utilization of the services

Postnatal care-supportive education during ANC most probably influenced positively the mothers' willingness to utilize PNC services in future.

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